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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/570,749	11/12/2007	Chandalata Raghu Kumar	007292-01 US	8728

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EXAMINER
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ARIANI, KADE

ART UNIT	PAPER NUMBER
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1651

MAIL DATE	DELIVERY MODE
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09/30/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/570,749	<b>Applicant(s)</b> RAGHU KUMAR ET AL.	
	<b>Examiner</b> KADE ARIANI	<b>Art Unit</b> 1651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☒ Claim(s) 1 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☒ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____.                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>03/23/2007</u> .  | 6) <input type="checkbox"/> Other: ____.                          |

***DETAILED ACTION***

The preliminary amendment filed on January 15, 2008, has been received and entered.

Claims 1-17 are pending in this application and were examined on their merits.

***Objections***

Claim 1 and the Title are objected to because the word "novel" is inappropriate in each.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-17 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

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The invention appears to employ a strain of fungus. It is not clear if the written description is sufficiently repeatable to avoid the need for a deposit. Further it is unclear if the starting materials were readily available to the public at the time of invention.

It appears that a deposit was made in this application as filed as noted, on page 1 lines 5-10 and page 4 lines 25-30, of the specification. However, it is not clear if the deposit meets all of the criteria set forth in 37 CFR 1.801-1.809. Applicant or applicant's representative may provide assurance of compliance with the requirements of 35 U.S.C § 112, first paragraph, in the following manner.

#### SUGGESTION FOR DEPOSIT OF BIOLOGICAL MATERIAL

A declaration by applicant, assignee, or applicant's agent identifying a deposit of biological material and averring the following may be sufficient to overcome an objection and rejection based on a lack of availability of biological material.

1. Identifies declarant.
2. States that a deposit of the material has been made in a depository affording permanence of the deposit and ready accessibility thereto by the public if a patent is granted. The depository is to be identified by name and address.

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3. States that the deposited material has been accorded a specific (recited) accession number.

4. States that all restriction on the availability to the public of the material so deposited will be irrevocably removed upon the granting of a patent.

5. States that the material has been deposited under conditions that access to the material will be available during the pendency of the patent application to one determined by the Commissioner to be entitled thereto under 37 CFR 1.14 and 35 U.S.C § 122.

6. States that the deposited material will be maintained with all the care necessary to keep it viable and uncontaminated for a period of at least five years after the most recent request for the furnishing of a sample of the deposited microorganism, and in any case, for a period of at least thirty (30) years after the date of deposit for the enforceable life of the patent, whichever period is longer.

7. That he/she declares further that all statements made therein of his/her own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code

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and that such willful false statements may jeopardize the validity of the instant patent application or any patent issuing thereon.

Alternatively, it may be averred that deposited material has been accepted for deposit under the Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the purpose of Patent Procedure (e.g. see 961 OG 21, 1977) and that all restrictions on the availability to the public of the material so deposited will be irrevocably removed upon the granting of a patent.

Additionally, the deposit must be referred to in the body of the specification and be identified by deposit (accession) number, date of deposit, name and address of the depository and the complete taxonomic description.

### ***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 17 is rejected under 35 U.S.C. 101, because the claimed invention is directed to non-statutory subject matter.

Claim 17 is directed to “a fungus”. A fungus is a naturally occurring microorganism and is not a “manufacture”. The claim does not require any physical transformation of the fungus. The claimed invention would impermissibly cover every substantial practical application of, and thereby preempt all use of a product of nature.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 17 is rejected under 35 U.S.C. 102(b) as being anticipated by Pointing et al. (World Journal of Microbiology & Biotechnology, 2000, Vol. 16, p.199-205) as evidenced by GenBank, basidiomycete sp. HKUCC 4062.

Claim 17 is drawn to a fungal strain, non-sporulating fungus, grows as white, fluffy mycelium on malt extract medium, and exhibits 99% homology to an unidentified basidiomycete species AY187277.

Pointing et al. disclose a fungal strain, a white-rot basidiomycetous fungi, basidiomycete sp. HKUCC 4062 (Abstract and Materials and Methods lines 9-10). It must be noted that basidiomycete sp. HKUCC 4062 is AY187277 (see GenBank).

Pointing et al. is silent about the phenotype of the fungus, fluffy mycelium and being non-sporulating, however because the fungus is the same as the claimed strain therefore, it must inherently have the same characteristics.

Pointing et al. therefore clearly anticipate the claimed fungal strain.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Raghukumar et al. (US Patent No. 6,613,559 B2) in view of Galhaup et al. (Microbiology, 2002, Vol. 148, 2159-2169) and Abadulla et al. (Applied and Environmental Microbiology, 2000, Vol. 66, No.8, p.3357-3362) and Spencer et al. (Biotechnology and Bioengineering, 1973, Vol. XV, p.1-12).

Claim 1-16 are drawn to a process for the decolorization of colored effluents, which comprises: a) culturing a filamentous, non-sporulating fungus (MTCC deposit number 5159) having the characteristics such as herein described in a conventional nutrient medium optionally prepared with sea water with salinity ranging from 25 to 35 parts per thousand optionally containing assimilable C and N source for a period of 6 to 12 days to obtain a fungal biomass; b) separating the fungal biomass from the culture medium of step [a] to obtain cell-free supernatant; c) freezing the cell-free supernatant obtained in step (b) for 12 to 24 hours followed by thawing thereof to obtain a precipitate containing the exopolymeric substance (EPS) and a supernatant; d) precipitating the remaining EPS from the supernatant obtained in step (c) with methanol; e) pooling and centrifuging the precipitates obtained in step (c) and (d) to obtain exopolymeric substance;



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f) contacting the colored effluents optionally in a diluted form either with the fungal biomass obtained in step (a) or cell-free supernatant obtained in step (b) or the exopolymeric substance as obtained in step (f) for a period ranging from 6 hours to 6 days at temperature ranging from 30 to 60 degree C and pH ranging from 3 to 6 to get decolorized water, wherein the colored effluents are preferably selected from the group consisting of black liquor from paper and pulp industries, molasses spent wash from distilleries, textile dye waste-waters and synthetic dyes, wherein the fungal biomass is cultured for at least 6 days to get maximum decolorization of colored effluents, wherein the carbon source used for growing the fungus is preferably selected from glucose, fructose, sorbitol and starch, wherein the concentration of the carbon source for growing the fungus is at least 1%, wherein the nitrogen source used for growing the fungus is preferably selected from peptone and ammonium tartarate, wherein the concentration of the nitrogen source for growing the fungus is at least 0.02%, wherein the medium for growing the fungus is preferably prepared with seawater having 25 parts per thousand salinity, wherein the fungal biomass is cultured for a period of at least 6 days, wherein the dilution of the colored effluents is done in the range of 10 to 20%, wherein contacting of the colored effluents with fungal biomass is carried out for a period of preferably 2 to 6 days at a temperature preferably 30 degree C and pH preferably 6.0, wherein contacting of the colored effluents with the cell-free supernatant is carried out for a period of preferably 12 hours at a temperature preferably 60 degree C and pH preferably 6.0, wherein contacting of the colored effluents with the exopolymeric substance is carried out for a

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period of preferably 24 hours at a temperature preferably 60 degree C and pH preferably 6.0, wherein separation of the fungal biomass from the culture medium is carried out preferably by vacuum filtration or centrifugation, wherein the fungal biomass is preferably immobilized on cubes or sheets of polyurethane foam or any other conventional known immobilization support.

Raghukumar et al. teach a process for the decolorization of colored effluents, which comprises, culturing a filamentous, non-sporulating fungus (Abstract and column 4 lines 5-7) having the characteristics such as herein described in a conventional nutrient medium optionally prepared with sea water with salinity ranging from 0 to 15 parts per thousand containing assimilable C and N source for a period of 6 to 12 days to obtain a fungal biomass, at room temperature and pH 4.5 (column 3 lines 55-68 and column 5 lines 10-24 and column 6 Example 1), separating the fungal biomass from the culture medium (column 6 Example 2 lines 49-50), molasses spent wash from distilleries (column 4 lines 14-15). Raghukumar et al. teach the fungal biomass is cultured for at least 6 days to get maximum decolorization of colored effluents (column 6 Example 2 lines 56-60), wherein the carbon source is glucose, the concentration of the carbon source for growing the fungus is at least 1%, the nitrogen source is peptone, the concentration of the nitrogen source for growing the fungus is at least 0.02% (Column 6 lines 29-35 and 44). Raghukumar et al. further teach the fungal biomass is immobilized by conventional known immobilization support (column 5 lines 7-9). Raghukumar et al. also teach since most industrial effluents from textiles paper and pulp, contain chromogenic substances as well as high concentration of salts, salt tolerant organisms

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are better suited for such wastewater treatment and fungi need to be tested for their salt tolerance (column 5 lines 40-47).

Raghukumar et al. do not teach freezing the cell-free supernatant obtained in for 12 to 24 hours followed by thawing thereof to obtain a precipitate containing the exopolymeric substance (EPS) and a supernatant, pooling and centrifuging the precipitates to obtain exopolymeric substance precipitating the remaining EPS with methanol, contacting the colored effluents with fungal biomass is carried out at a 30 degree C temperature and pH 6.0, contacting the colored effluents with the exopolymeric substance carried out for a period of preferably 24 hours 60 degree C temperature and pH 6.0, separation by centrifugation, and the medium for growing the fungus is preferably prepared with seawater having 25 parts per thousand salinity.

However, Galhaup et al. teach separating the mycelia by centrifugation, freezing the culture supernatant followed by thawing thereof to precipitate and separate polysaccharides (exopolymeric substance), in order to purify laccase (p.2160 2<sup>nd</sup> column 4<sup>th</sup> paragraph lines 1-10).

Spencer et al. teach using methanol for precipitating extracellular polysaccharides of fungi (p.8 2<sup>nd</sup> paragraph lines 7-8). It must be noted that exopolymeric substance (EPS) are exo-polysaccharides.

Abadulla et al. teach salts are laccase inhibitors and are applied in combination with dyes to test their inhibitory effects on the immobilized and free enzyme (p.3359 1<sup>st</sup> column 3<sup>rd</sup> paragraph lines 3-6).

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Therefore, in view of the above teachings, a person of ordinary skill in the art at the time the invention was made, would have been motivated to apply the teachings of Galhaup et al. and Spencer et al. in the method as taught by Raghukumar et al. in order to provide a method for the decolorization of colored effluents, with a reasonable expectation of success. Because Galhaup et al. teach precipitating polysaccharides (exopolymeric substance) by centrifugation, freezing the culture supernatant followed by thawing and because Spencer et al. teach using methanol for precipitating extracellular polysaccharides.

Moreover, a person of ordinary skill in the art at the time the invention was made, knowing that most industrial effluents contain chromogenic substances as well as high concentration of salts and salts are laccase inhibitors, would have been motivated to increase the salinity of the medium in the method as taught by Raghukumar et al. in order to provide a method for the decolorization of colored effluents, with a reasonable expectation of success. The motivation would be to test the salt tolerance of the fungus.

Accordingly, because the temperature and pH of colored effluents would have been different depending on the temperature and pH conditions of the source of the effluents, a person of ordinary skill in the art at the time the invention was made, would have been motivated to optimize the pH and temperature of the medium in the method as taught by Raghukumar et al. to mimic the conditions of the source, in order to test the efficiency of the decolorization by the fungal biomass and/or the exopolymeric substance.

### ***Conclusion***

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No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kade Ariani whose telephone number is (571) 272-6083. The examiner can normally be reached on IFP.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Wityshyn can be reached on (571) 272-0926. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kade Ariani  
Examiner  
Art Unit 1651

/Leon B Lankford/  
Primary Examiner, Art Unit 1651